REMARKS

Applicants appreciate the detailed examination evidenced by the Office Action mailed November 25, 2005 (hereinafter "Office Action"). Applicants respectfully traverse the rejections of independent Claims 1 and 26 based on the cited combination of U.S. Patent No. 6,094,200 to Olsen et al. (hereinafter "Olsen") and U.S. Patent No. 6,204,856 to Wood et al. (hereinafter "Wood"), because Olsen and Wood fail to provide several of the teachings alleged by the Office Action, and because the Office Action fails to provide the required clear and particular evidence from the prior art of a motivation or suggestion to combine these references as proposed in the Office Action. Applicants also traverse the rejections of independent Claims 15, 20 and 23 based on the cited combination of Olsen, Wood and U.S. Patent No. 6,313,839 to Larson (hereinafter "Larson"), as the Olsen and Wood references do not provide the teachings alleged by the Office Action and because the Office Action fails to provide the required clear and particular evidence from the prior art of a motivation or suggestion to combine these references as proposed in the Office Action. Applicants further submit that several of the claims depending from independent Claims 1, 15, 20, 23 and 26 are separately patentable. Applicant have also added new Claims 29-41, which claim subject matter to which Applicants are entitled by virtue of the disclosure of the application as filed and which are patentable over the references of record.

Independent Claims 1, 23 and 26 are patentable over Olsen and Wood

As an initial matter, the Office Action is contradictory in identifying which claims are rejected, and on what grounds. In particular, on page 2, the Office Action identifies Claims 1, 3, 6, 17, 25 and 26 as being rejected as being allegedly obvious with respect to a combination of Olsen and Wood, but then provides a detailed basis for rejection of Claim 23. On page 4 of the Office Action, however, it is indicated that Claim 23 is rejected based on a combination of Olsen, Wood and Larson, but no grounds is provided for this rejection. Accordingly, for purposes of the present response, Applicants assume that Claim 23 stands rejected as obvious over Olsen and Wood. Should this not be the case, Applicants request that any subsequent rejection clarify of the nature of the rejection of Claim 23, and that such rejection not be made final.

Turning to the rejection of Claim 1, Applicants submit that the interpretation of Olsen is erroneous. In particular, the Office Action cites Olsen as teaching "setting occlusion flags for respective tiles of a row of tiles" at column 5, lines 52-56 of Olsen, and "processing pixels in rows of pixels in a row-by-row manner responsive to the occlusion flags" at column 5, lines 22-23 of Olsen. The first cited passage from Olsen makes no mention of tiles. Rather, this passage refers to depth comparison function for a *bounded volume*, not a tile and, therefore, does not disclose or suggest "setting occlusion flags for respective tiles of a row of *tiles*." The second passage refers to depth comparison for pixels of a plurality of "graphics primitives defining the bounding volume." There is nothing disclosed or suggested in this passage about "processing pixels in rows of pixels in a row-by-row manner responsive to the occlusion flags." Thus, the passages cited from Olsen do not provide the teachings alleged in the Office Action.

The grounds asserted for combining Olsen and Wood also do not meet the requirements for supporting a rejection under § 103. In particular, the Office Action states "[i]t would have been obvious . . . to combine the teachings of Olsen et al. with Wood et al. because this combination would provide the determination of occlusion of each row of pixels comprising the tiles of a graphics primitive, which would reduce computation time by providing only the visible pixels to be rendered." Office Action, p. 3. As noted above, Olsen describes occlusion determination using a "bounding volume" for an object, which is described as "graphics primitives that enclose the object." Olsen, column 4, line 66 through column 5, line 1. This has nothing to do with Wood, which describes how different attributes, such as color, can be interpolated across the surface of a triangle primitive. *See* Wood, column 1, line 65 through column 2, line 5. The Office Action provides no clear and particular evidence from the prior art that teaches or suggests how such disparate references could be combined or, even if these disparate references could be combined, why this particular combination would be desirable to "reduce computation time."

For at least these additional reasons, Applicants submit that the rejection of Claim 1 is erroneous and should be withdrawn. Applicants submit that the rejection of Claim 23 (an apparatus analog of method Claim 1) is erroneous for at least similar reasons and should also be withdrawn.

Applicants submit that the rejection of independent Claim 26 is flawed for at least similar reasons. The Office Action cites column 5, lines 42-45 of Olsen as allegedly teaching "setting the occlusion flag which indicates non-occlusion." Office Action, p. 4. As noted, above, the "depth compare result register" described in this passage holds a value that "indicates that at least one pixel from primitives defining the *bounded volume* passes the depth comparison function." Olsen, column 5, lines 51-55 (emphasis added). Thus, Olsen does not teach or suggest "an occlusion flag for a *tile*," or operations based on such an occlusion flag recited in Claim 26. Moreover, as discussed above, Olsen and Wood are not properly combinable. For at least these reasons, Applicants submit that the rejection of independent Claim 26 is erroneous and should be withdrawn.

Independent Claim 15 is patentable over Olsen, Wood and Larson

As noted above, there is a discrepancy between the claims listed as being rejected based on the combination of Olsen, Wood and Larson on page 2, and the grounds provided on pages 4-14. In particular, although it is indicated on page 4 that Claim 23 is rejected based on Olsen, Wood and Larson, no substantive basis is provided for the rejection of Claim 23. Accordingly, Applicants will not address Claim 23 with respect to the cited combination of Olsen, Wood and Larson, as the patentability of Claim 23 has been addressed above. Should a subsequent office action raise a rejection of Claim 23 based on a combination of Olsen, Wood and Larson, Applicants request that such rejection not be made final.

With respect to the rejection of Claim 15, the Office Action asserts that Olsen teaches "setting an occlusion flag" at column 6, lines 8-13. Office Action, p. 12. As discussed above, the "compare result register" described in Olsen is for a *bounded volume,* not for a *tile*. Thus, this allegation as to the teachings of Olsen is erroneous. The Office Action also alleges that Olsen teaches "processing pixels in rows of pixels in a row-by-row manner responsive to the occlusion flags" at column 5, lines 22-23. As discussed above with reference to the rejection of Claim 1, this passage from Olsen does not provide such a teaching. Accordingly, Olsen does not provide the teachings of the recitations of Claim 15 alleged in the Office Action and, therefore, the cited combination of Olsen, Wood and Larson does not teach or suggest all of the recitations of Claim 15. Furthermore, for reasons similar to those discussed

above with reference to Claims 1, 23 and 26, Olsen and Wood are not properly combinable. For at least these reasons, the rejection of Claim 15 is erroneous and should be withdrawn.

The dependent claims are patentable

Applicants submit that dependent Claims 2-14, 16-19, 21, 22, 24, 25, 27 and 28 are patentable at least by virtue of the patentability of the various ones of independent Claims 1, 15, 20, 23, and 26 from which they depend. Applicants further submit that several of these dependent claims are also separately patentable.

For example, Claim 4 recites:

> . . . wherein the occlusion flags are stored in a tile occlusion information cache that is configured to store respective occlusion flags for respective tiles of a row of tiles and respective occlusion threshold depth values for the respective tiles of the row of tiles; and wherein setting occlusion flags comprises:
> determining a maximum depth value for the graphics primitive for a tile;
> comparing the maximum depth value to the cached occlusion threshold depth value for the tile in the tile occlusion information cache; and
> setting the occlusion flag for the tile responsive to the comparison.

The Office Action alleges that column 1, lines 59-60 of Larson teaches "determining a maximum depth value for the graphics primitive," and that column 2, lines 46-51 of Larson teaches "comparing the maximum depth value with the cached occlusion threshold." Office Action, p. 5. Applicants respectfully disagree. The first passage from Larson refers to storing maximum Z values "for each *region* of Z values stored in a Z buffer memory device," wherein the "maximum Z value corresponds to the largest Z value of a *region* of Z values." Larson, column 1, lines 55, 56 and 59-60 (emphasis added). A "maximum Z value" as described in Larson is not "a maximum depth value *for the graphics primitive*." Rather, the maximum Z value in Larson represents a current maximum depth for a region, which is updated as Z values in the region are processed. Accordingly, Larson does not teach or suggest "determining a maximum depth value for the graphics primitive," " comparing the maximum depth value to the cached occlusion threshold depth value for the tile in the tile occlusion information cache" or "setting the occlusion flag for the tile responsive to the comparison," as recited in Claim 4. For at least these reasons, Applicants submit that Claim

4 and the claims depending therefrom are separately patentable. Similar reasons support the separate patentability of Claims 22 and 28.

Claim 18 recites "wherein the representative depth values comprise maximum depths of the graphics primitive in the tiles, and wherein the occlusion criterion is whether a maximum depth for the graphics primitive in the tile is less than a previously established minimum non-occlusion depth value for the tile." In rejecting Claim 18, the Office Action alleges that column 1, lines 59-60 and column 6, lines 23-30 provide the alleged teaching. However, as noted above, the "maximum Z value" described in the cited passage from column 1 of Larson is not a "maximum depth *for the graphics primitive*." Moreover, the comparison described in the cited passage from column 6 of Larson is a comparison of a "received Z value," *i.e.*, the Z value for a primitive at a particular pixel location, to a current minimum Z value. Thus, this passage does not disclose or suggest an occlusion criterion of "whether a maximum depth for the graphics primitive in the tile is less than a previously established minimum non-occlusion depth value for the tile." Accordingly, Larson does not provide the alleged teachings and, for at least these reasons, Claim 18 is separately patentable. Similar reasons support the separate patentability of Claim 30.

New Claims 29-42 are patentable

Applicants submit that new Claims 29-42 are supported by the disclosure of the application as filed. In particular, new independent Claim 29 recites:
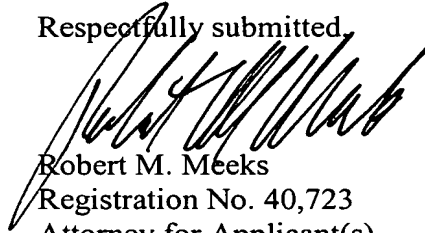
> A graphics processing method, comprising:
> defining a plurality of tiles in a graphics display field, each tile comprising a plurality of pixels;
> determining a maximum depth value for a graphic primitive;
> setting an occlusion flag for the tile responsive to a comparison of a previously-determined minimum depth value for the tile to the maximum depth value for the graphics primitive; and
> processing a pixel for the graphics primitive responsive to the occlusion flag.

Such recitations are supported, for example, by the description at pages 13 and 14 of the specification with reference to FIG. 4. Applicants submit that these claims are patentable over the cited references.

Conclusion

As all of the claims are now in condition for allowance, Applicants respectfully request allowance of the claims and passing of the application to issue in due course. Applicants urge the Examiner to contact Applicants' undersigned representative at (919) 854-1400 to resolve any remaining formal issues.
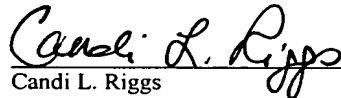
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on February 21, 2006.

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